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Forest Pest Management

BIOLOGICAL EVALUATION R2-76-3

MOUNTAIN PINE BEETLE

Black Hills of South Dakota and Wyoming

Black Hills National Forest and Surrounding State, Private and other Federal Lands

JUNE 1976

Rocky Mountain Region

U.S. Department of Agriculture Forest Service

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INTRODUCTION

The mountain pine beetle, Dendroctonus ponderosae Hopkins, continues to cause extensive ponderosa pine mortality on the Black Hills National Forest and surrounding State, Private and other Federal lands in South Dakota and Wyoming. Losses due to the mountain pine beetle in 1975 were estimated at 875,000 trees (Yarger 1975). Heaviest losses continue to occur in the areas of western South Dakota, eastern Wyoming, and the southern Bear Lodge Mountains of Wyoming.

On June 29 - July 1, 1976, entomologists Donn Cahill and Larry Yarger conducted a mountain pine beetle brood survey to evaluate the over-wintered population and predict the trend of the infestation in 1976. Utilizing Knight's (1960) "Sequential Sampling of Black Hills Beetle Population", which is based on bark samples, the trend of the current infestation was determined at 14 locations on National Forest land. Samples from thirteen areas showed that the population trend was increasing. One area near Intake Gulch, T. 3 N., R. 1 E., Sec. 3, on the Spearfish Ranger District indicated a localized static-increasing trend. Although brood samples were taken on National Forest land only, the results of the survey are applicable to lands of all ownerships in the Black Hills area.

TECHNICAL INFORMATION

Causal Agent -- Mountain Pine Beetle, Dendroctonus ponderosae Hopkins.

Host Tree Attacked -- Ponderosa Pine, Pinus ponderosae Laws.

Extent of Infestation -- Losses continue to occur in over-stocked stands throughout the Black Hills National Forest and adjacent state, private, and other Federal lands in Wyoming and South Dakota.

Life History -- The mountain pine beetle has one generation per year. Adults attack trees mid-July through early September by boring through the bark to the cambium, then tunnel upward for 12 inches to 30 inches. The females lay eggs in individual niches along each side of the gallery which is then packed with partially-digested wood particles called frass. After hatching, the larvae feed in individual channels at right angles to the egg gallery in the phloem. The insect overwinters in the larvel stage. In the spring, when the larvae are fully developed, they excavate an oval chamber at the end of the larval gallery and pupate. Mature adults emerge from these chambers by boring to the outer bark surface, fly to attack new trees, and start another generation.

METHODS

Two 6-by-6-inch bark samples were taken at dbh. on opposite sides of currently-infested ponderosa pine trees at 14 locations throughout the infestation. For each sample, the total number of brood regardless of stage, inches of egg gallery and number of each species of predators and parasitoids were tabulated. In addition, at each sample location, the basal area of the sampled location, including currently-infested and uninfested trees, was measured and the degree of woodpeckering noted. Using Knight's (1960) sequential sampling plan, the trend of the beetle population at each sample area was categorized as decreasing, static, or increasing.

RESULTS

At thirteen of the sample locations, brood numbers showed an increasing trend for the mountain pine beetle population. Samples near Intake Gulch, T. 3 N., R. 1 E., Sec. 3, indicated a localized static-increasing population trend. Predators, parastoids, and woodpeckers appear to be causing little brood mortality. Sample data from all locations is summarized in Table 1.

From these samples it can be generalized that the entire infestation in the Black Hills area is continuing to increase. The mountain pine beetle is expected to again cause epidemic ponderosa pine losses in 1976. Forest Insect and Disease Management personnel will continue to monitor the population in the Fall of 1976 using aerial surveys and ground strip cruises.

REFERENCES CITED

KNIGHT, F. B. 1960. Sequential sampling of Black Hills beetle populations. USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station Research Note #48, 8 p.

YARGER, L. C. 1975. Mountain Pine Beetle, Black Hills of South Dakota and Wyoming. USDA, Forest Service, State and Private Forestry, R2-75-29. 5 p. Biological Evaluation.

TABLE 1 SUMMARY OF THE MOUNTAIN PINE BEETLE BROOD SURVEY, JUNE 1976

AREA	# TREES SAMPLED	AVE. DBH (INCHES)	TOTAL BROOD	AVERAGE BROOD 6x6	AVERAGE IN. GAL 6x6	AVERAGE # CLERIDS 6x6	AVERAGE # MEDETERA 6x6	WOODPECKERING	(FT.2/ACRE) BASAL AREA	(FEET) ELEVATION	POPULATION TREND
Strawberry Creek T. 4 N., R. 3 E., Sec. 2	13	11.6 ± .8	361	13.9 ± 2.0	35.0 ± 1.5	.04 ± .04	.30 ± .16	NONE	200	5100	INCREASING
Rochford T. 2 S., R. 3 E., Sec. 2	10	11.5 ± .6	309	15.5 ± 2.9	34.8 ± 2.8	0 ± 0	.90 ± .30	NONE	150	5500	INCREASING
Medicine Mountain T. 2 S., R. 3 E., Sec. 2	10	11.6 ± .7	342	17.1 ± 3.0	39.0 ± 1.9	0 ± 0	.05 ± .05	NONE	160	6300	INCREASING
Ditch Creek R. 1 S., R. 2 E., Sec. 23	10	10.3 ± .4	388	19.4 ± 2.0	34.6 ± 1.4	.10 ± .10	.20 ± .16	NONE	120	6250	INCREASING
Kirk Hill T. 4 N., R. 4 E., Sec. 12	10	12.4 ± .6	432	21.6 ± 2.9	33.3 ± 1.7	.10 ± .07	.45 ± .17	NONE	200	5500	INCREASING
Yellowjacket Springs T. 3 N., R. 1 E., Sec. 19	;-	13.2 ± .6	396	19.8 ± 2.5	40.2 ± 2.1	0 ± 0	1.10 ± .32	NONE	170	6200	INCREASING
Deer Mountain R. 4 N., R. 2 E., Sec. 19	13	13.6 ± .6	364	14.0 ± 1.6	33.7 ± 1.6	.04 ± .04	.80 ± .31	NONE	130	6200	INCREASING
Boulder Creek T. 5 N., R. 4 E., Sec. 17	10	13.3 ± .6	331	16.6 ± 2.4	41.7 ± 2.4	.20 ± .16	.05 ± .05	LIGHT	170	4450	INCREASING
Ogden Creek T. 52 N., R. 63 W., Sec. 27	10	12.0 ± .9	343	17.2 ± 3.0	26.3 ± 2.4	.05 ± .05	1.1 ± .05	NONE	170	5600	INCREASING
Newton Hill T. 53 N., R. 63 W., Sec. 33	10	13.8 ± .7	169	8.5 ± 2.0	25.3 ± 2.1	.15 ± .11	.80 ± .29	NONE	210	5800	INCREASING
Lytle Creek T. 52 N., R. 64 W., Sec. 13	10	11.5 ± .4	418	20.9 ± 3.0	29.5 ± 1.8	.15 ± .08	.60 ± .24	LIGHT	300	5900	INCREASING
Ogden Creek T. 52 N., R. 63 W., Sec. 29	10	12.7 ± .8	438	21.9 ± 3.0	32.3 ± 2.3	0 ± 0	.80 ± .29	LIGHT	260	6000	INCREASING
Intake Gulch T. 3 N., R. 1 E., Sec. 3	10	21.4 ±1.0	160	8.0 ± 2.7	28.0 ± 2.8	.05 ± .05	.45 ± .21	NONE		6320	STATIC-INCREASING
Lander Spring T. 3 N., R. 1 E., Sec. 13	10	11.4 ± .6	244	12.2 ± 1.7	28.4 ± 1.6	0 ± 0	.15 ± .11	NONE	200	6340	INCREASING
TOTAL	146		4695								
AVE. & S. E.	10.4 ± .3	12.9 ± .3		16.0 ± .7	33.1 ± .6	.07 ± .02	.55 ± .07		188 ± 13	5819 ± 147	
RANGE	10 - 13	8.2-26.8		0 - 55	0 - 59	0 - 3	0 - 7	NONE - LIGHT	130 - 300	4450 - 6340	